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The Maryland Fruit Grower

Published Monthly by the Maryland State Horticultural Society

Edited by the Secretary, A. F. Vierheller, Extension Horticulturist

Vol. 5 **January, 1935** **No. 1**

THE THIRTY-SEVENTH ANNUAL MEETING

It seems that every meeting is "the best one that we have held", but according to some of the growers present, the meetings held at College Park on January 2, 3, and 4, were "the best ever held anywhere". All those who had anything to do with staging the meetings deeply appreciate the high tribute.

The weather was ideal, and in addition to the large representation of Maryland growers, there were representative growers present from West Virginia, Virginia, Pennsylvania, Delaware, and New Jersey. We always welcome fruit growers from any state and invite them to come again.

The exhibits were the largest and best that we have had in College Park. The commercial exhibits were novel and attractive. The machinery exhibits showed the latest in spray machines, fruit washers and cleaners, graders and sizers, basket lidders, dusting machines, tractors, orchard tillage tools and general orchard supplies. The educational exhibits were staged by various departments of the University. The decorations were tastefully worked out, and amid attractive surroundings, growers were able to study the effects of fruit thinning, picking at the proper time, and the methods used in fruit washing, and the laboratory determinations of residues. There were microscopes showing stages of disease development, and the life histories of various diseases were shown in detail. A fine exhibit pertaining to bee culture, and pollination, as well as the past year's development of the more serious orchard insect pests, occupied a prominent place. This exhibit was staged by the Student Entomology Club. An attractive feature of the exhibit was the fruit display set up by the horticultural students. The exhibit contained almost 200 flats of fruit packed in various packs, wraps, and designs. In addition there was a display of new and old fruit varieties from Maryland and other fruit growing States. There was also a display of the important types and varieties of nuts. The State Department of Markets showed us how some of our apples look when we take them out of storage.

Some of the more important points brought out by the various speakers might be summarized as follows:

Dr. A. L. Schrader of the Maryland Experiment Station stated that nitrogen fertilizers applied to apple trees in the fall and spring, as split applications, compared with fall or spring applications gave uniformly best responses in growth, yield, and maturity of fruit with all forms of nitrogen, including nitrate of soda, ammonium sulfate, leunasalpeter, cyanamide, urea, calcium nitrate, and calnitro. Trees needing nitrogen as evidenced by poor growth and yellowed foliage, responded best to nitrate of soda in the first three years, but later responses were equal in all materials, after the trees were in good growth condition. Starting with trees in good growth condition, all materials gave equal responses. Dr. J. H. Gourley of Ohio State University Department of Horticulture ascribed russeting of fruit to a large number of causes, many of which were under the control of the grower. Avoiding low sites, planting varieties less susceptible to russet, care in application of spray materials, and especially avoiding spraying at low or very

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high temperatures, (above 82°) and on days when fruits would not dry rapidly, were among the suggestions made. The discussion of Mr. H. W. Miller, a West Virginia fruit grower, gave experiences bearing out some of the facts as stated by Dr. Gourley.

The uncertainty of predicting rosy aphis infestations was explained by Dr. B. A. Porter of the U. S. Bureau of Entomology. The eggs are found on the inside branches of the trees, and the rosy aphis appears later than the grain aphis, whose eggs are usually found on the outer twigs. It is impossible to predict a serious outbreak of rosy aphis, but we have several good controls for aphis in the egg stage, these materials being tar oil, or cresylic acid sprays. If mineral oil is added to control scale, a complete aphis and scale spray may be used in the dormant season.

Dr. Peterson gave facts about the various forms of sulphur and wettable sulphurs, and the possibilities and limitations of these sulphurs as compared with lime-sulphur. Some hope was given that lime-sulphur may be improved to avoid some of the spray burn injury now experienced.

Dr. J. R. Magness of the U. S. Department of Agriculture, stated that water shortage is most often apparent on shallow soils or soils lacking organic matter. Organic matter aids particularly in preventing run-off and allows better penetration of rains. Growth of the fruit may slow down or even stop during period of water shortage, but will resume the same rate of growth if water supply is renewed. The fruit size can thus be determined by the duration of any drought period, together with its effect on rate of growth. Irrigation would pay under Eastern conditions on some soils whose water-holding capacity is low, if the cost of supplying water does not exceed about $25.00 per acre. Irrigation costs would be determined by distance from water supply, lift of water, power costs, etc. Mr. E. C. McFadden of American Fruit Growers reported that irrigation paid on Tonoloway Orchard under the severe drought conditions of 1930, but the profit could not be computed.

Dr. D. F. Fisher of the U. S. Department of Agriculture discussed various types of cork injury, giving among the causes, water shortage followed by rain, the size of crop, size of fruits, root injuries, and shallow soils. Organic matter was considered especially important as a possible remedy, several reasons being given. Dr. J. H. Gourley of Ohio gave experiences with mulching of orchards for several years, in Ohio. Mulching did not increase organic matter in the soils to any depth, but was of material benefit in preventing water run-off and evaporation, and assisted in development in a mass of fibrous roots close to the soil surface. Mulch should be heavy enough to kill off all plant growth under the tree, thus preventing loss of water through growth of such plants. Mulching materially reduced cracking of Stayman apples.

Pruning, fertilization, soil culture and thinning of peaches were considered by Dr. F. P. Cullinan of U. S. Department of Agriculture, the speaker stating that nitrogen, moisture and leaf area were the major factors to consider in cultural practices. Growth of peach fruit is not constant as in the apple, but has an early period of growth, and a final swell after a period of little growth during pit hardening. Early growth is rapid and is correlated with the size developed during the final swell. Early thinning, cover crops, nitrogen fertilizers and proper pruning were all necessary for fruit size and color. Lespedeza looks promising as a cover crop in the young peach orchard. Mr. Byron Roberts, a New Jersey fruit grower reported that peach growing experiences had led him to plant peaches 20 by 30 feet, and to grow better cover

crops in the young orchards due to difficulty of good cover crops in older orchards. Use of complete fertilizers, lime and covers crops adapted to his soils and conditions were essential.

At the annual dinner, Dr. R. A. Pearson, President of the University of Maryland in welcoming the growers, stated that the University was anxious to aid the growers if they would make their wants known. Mr. Tolley, of the Agricultural Adjustment Administration advised the growers that 70 codes and licenses had been put into effect by the A.A.A. Western and Southern fruit growers, especially in cooperatives had formulated agreements on movement of certain fruit crops and fruit for canning, and had, in a few cases fixed a minimum price. Cooperation among apple growers in the East, who export, might be a possibility, leading toward a marketing agreement on export of Eastern apples.

Dr. E. N. Cory, Maryland State Entomologist stated that there was some increase in scale in peach orchards, also red mite in various orchards. Red mite is best controlled by delayed dormant oil sprays, as the eggs are in condition for kill at the later stage. Codling moth remains our most serious insect pest, and the grower must rely on sanitation measures, more thorough spraying, using lead arsenate, and being prepared to wash the fruit if a heavy spray program must be followed to control the moth.

Mr. C. E. Bryan, a Maryland fruit grower emphasized better care in the handling of peaches and apples at harvest. Use of half-bushel metal picking buckets for apples, and five-eights bushel basket for picking peaches and for hauling all fruit to the packing house, minimized bruising. Marking each package with the facer's and packer's numbers afforded check on bruises that could be traced back. Three orchard foremen check on handling of fruit in the orchard. The E-Z pack bushel was used for apples. Peaches were picked and hauled in five-eights baskets but were packed in Georgia carriers by special packing crew.

Mr. Edwin Gould, Entomologist from W. Va. Experiment Station found no spray as effective, to date, as lead arsenate for codling moth control. He recommended removal of props from the orchard, also destruction of brush, tall, woody weeds, scraping and banding of trees, and burning the scrapings. Screening the packing house, storage of picking equipment in tight buildings, removal of culls and drops, and use of burlap bands on parts of the packing house machinery were also suggested as means of reducing the over-wintering moth larvae. Mr. Byron Roberts of New Jersey also stressed orchard sanitation and general clean-up, and recommended pruning out of smaller wood throughout the tree, so as to allow better spray coverage when spraying up inside the tree. He plans to use a portable sprayer equipped with tower on top of the tank, to follow up the other sprayers, especially aiming to cover the tops of the trees with heavier spray.

Dr. J. H. Beaumont, Head of the University of Maryland Department of Horticulture summarized his results of experimental fruit washing investigations. His work showed that many types of residue can be brought to tolerance limit with ½ per cent hydrochloric acid. If necessary, strength of acid may range from ½ to 1½ per cent. Various wetting agents gave increased removal, as did heating the acid solution to 100° F. In cases of very heavy residues, heated acid plus a wetting agent was required. Heat plus a wetting agent added to the acid reduced all residues below tolerance in a flotation type washer. Various types of spray materials and time of application were used on the fruit included in these washing tests. In general, the procedure neces-

sary to bring residue below tolerance depends upon the amount of residue present before washing, and whether mineral oil or fungicides were used with the last arsenic or lead sprays. Dr. Fisher of the U. S. Department of Agriculture cautioned growers to rinse their fruit thoroughly after the acid wash; to watch the temperature of the acid, and also keep the acid up to proper strength, but to be sure not to allow the fruit to remain in the acid too long during the washing process.

THAT PRUNING JOB

Every year there is something written in regard to pruning, but it is always in order to caution the growers to look over their trees, and then think back to last harvest season, and find if there was something wrong with the number of cull and off-grade fruits. Tabulations made in the cull piles of several packing houses, last fall, by A. F. Vierheller showed a great number of culls due to limb rub and mechanical bruise. In some varieties and orchards, there was more of this than there was of insect injury. It would seem that the growers should give attention to removal of small twigs and branches throughout the tree, not only to remove causes that result in rubbed and battered fruits, but to open up the tree to a little better sunlight, and to help in better spray coverage. It was brought out during the recent meetings of the Society that we can not expect to spray the inside of the trees as we are instructed, to control codling moth, unless the trees are so pruned that the spray can reach all parts of the tree center. Of course, it will be necessary to thin the fruit, also, in order reduce limb rub, as well as to help the fruit to develop both size and color.

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A SUMMARY OF BAIT PAIL INVESTIGATIONS WITH REGARD TO THE ORIENTAL FRUIT MOTH

By

ERNEST N. CORY AND H. S. MCCONNELL
College Park, Maryland

At the request of the horticulturists the following summary of the status of bait pail work has been prepared from the published reports of various workers, but mainly from the more recent unpublished work of S. W. Frost and L. A. Stearns and the published work of W. P. Yetter, Jr. In each case credit is given to the respective author for the material used in this article and our thanks are extended to them for their permission to use their material and for their cooperation.

The use of fermenting syrup bait has gradually evolved in the composition of the baits, with little change in the containers or methods of using the bait pails. For the most part two types of containers are used; one a No. 10 or gallon can with an open top fitted with a bail, and in the other case a quart Mason jar with a covering of ¼ mesh hardware cloth designed to keep out large insects. These devices are suspended in the trees.

While considerable catches have always been made, it has been difficult to determine the percentage of population that has been caught and the extent to which the bait pails attracted moths from the outside into the orchard. There is no doubt that bait pails will catch a considerable number of moths throughout the season and this should influence the percentage of fruit and shoots that are infested.. The placing of the bait pails should be done early enough in the season to catch the first emerging moths and bait should be regularly attended in order to insure the maximum efficiency. In seasons when there is considerable rain, the bait pails will require more attention due to dilution of the bait. During periods of excessive dry weather, the evaporation must be made up by periodic additions of water. It is practically useless to embark on a bait pail project unless provision is made for thorough and timely attention to all of the details. They cannot be expected to work automatically.

Any Maryland grower should consult the Department of Entomology before embarking on a bait pail campaign.

The following excerpts from the printed results obtained by W. P. Yetter, Jr., at Vincennes, Indiana, and Cornelia, Georgia, indicate some of the difficulties and likewise show favorable results in large scale operations, details of which can be obtained by consulting the papers listed in the bibliography.

"The ability of the oriental fruit moth to fly long distances will prevent the use of bait traps as a control in any but large or isolated peach orchards, or except by several growers on a cooperative basis, unless a bait can be developed which is attractive enought to prevent all oviposition in its vicinity. If the baits at Cornelia attracted moths a mile in other directions as they did from the east, the 42,000-trap experiment affected the fruit-moth population over an area of at least ten equare miles.

"Baits in use at present cannot successfully complete against the odors emanating from the peach foliage and fruit. To be most attractive they must be placed in or very near the tree. Away from it they capture practically nothing. Since the natural odors are so much more powerful than the baits, it is not unreasonable to suppose, in the absence of the latter, that migration of the moths to more attractive peach or apple trees takes place as readily and over as great distances as in baited areas. If so, the tendency following the

emergence of each brood will be to nullify any other artificial control efforts not conducted on a large scale or in isolated orchards.

"Comparatively little is known of the chemistry of baits. The opportunities for increasing their efficiency should be great. Although the baits in use have at times captured as high as 85 per cent of the fruit-moth population, the average recovery is much less. Their efficiency, however, is actually greater than the percentage recovered indicates, since many marked moths unquestionably flew out of the area where the traps were being examined before attaining the condition where they reacted, positively to the bait, some were discarded because of questionable markings, and many were doubtless killed by natural enemies and weather conditions. When releases were made among a small number of traps, very poor recoveries were had and most of the moths recaptured were in outside traps. Fruit injury occurs largely as a result of third and fourth brood larval attack. Theoretically, a bait that could consistently reduce egg deposition 50 per cent would, through diminishing each successive brood by half, effect a reduction of 87 per cent in third-brood larvae and 93 per cent in fourth-brood.

"The release of 1,144 marked oriental fruit moths on 33 different days before harvest in a 16-acre orchard baited with 400 traps indicated that these traps were capturing 76 per cent of the emerging adults. Before capture the female moths had deposited nearly 14 per cent of their eggs. There was an apparent reduction in wormy fruit of not less than 60 per cent as a result of the bait-trapping despite the use of baits which capture an average of only 35 per cent as many moths per trap as the best tested in the orchard, and despite extensive migration from adjacent orchards into this small area. The release of 200 marked moths before harvest in a 37-acre orchard baited with 2,200 traps indicate that as high as 89 per cent of the moths were being captured, and after harvest the release of 492 moths on 17 different days indicated that the baits were capturing 41 per cent of those emerging in the area during this period. Previous to harvest the recaptured moths had deposited 3.6 per cent of their eggs, after harvest, 17.5 per cent before they were caught.

"It appears that the use of one trap per two trees permits less oviposition before capture than the use of one trap to four trees. The reduction in fruit injury in the larger baited orchard was greater than in the smaller one.

"The release of 1,978 marked moths in unbaited orchards proved that migration to baited or between baited orchards was extensive. Other evidence indicates that it is extensive between unbaited orchards and that the absence of fruit or succulent twig growth stimulates flight during the preoviposition period to other areas. Seven flights ranging between 1 and nearly 2 miles were recorded during 1932. A female which had flown a minimum distance of 9,900 feet deposited eggs after capture. This flight was made between two baited orchards. One hundred flights of more than one-fifth mile and sixteen of more than one-half mile were made. The four baited orchards, of which approximately 60 acres contained traps, very probably attracted moths from more than 1,000 acres of peach trees, since this acreage is located within one mile of one or more of them. For the same reason the number of moths migrating into the baited orchards may have been greater than the native population.

"Large-scale bait-trapping should give satisfactory results. Baiting on a smaller scale may eventually become practicable if more efficient baits can be developed. At present, large-scale operations, using approximately 50 traps per acre or one per two trees, should not cost more than $7.25 per acre

for the season at Cornelia. The development of more efficient baits which will make possible the use of fewer traps per acre will reduce this cost."

S. W. Front has been working for many years to improve the efficiency of bait materials. He presented the following table of results at the Pittsburg meeting last month and has supplemented it with comments that will not appear elsewhere in print.

"OUTSTANDING ORIENTAL FRUIT MOTH ATTRAHENTS ARRANGED IN ORDER OF ATTRACTIVENESS

*Attrahent**	*No. Oriental fruit moths*	*Cost per trap*
Linalool	7169	.010
Safrol	6541	.002
Propyl acetate	5735	.012
Amyl acetate	5458	.001
Anethol	5162	.004
Fennel seed oil	4983	.004
Terpinyl acetate	4798	.008
Furfural	4699	.003
Syrup 1-20	2292	.07

*The attrahents were added to the 1-20 syrup solution at the rate of 1 cc. per trap or approximately ¼ pint to 100 gallons of the syrup solution.

"During 1934, bait traps gave considerable reduction in the oriental fruit moth population. 440 traps were used in a ten acre Elberta orchard from May 4 to October 13. The baits were changed four times during the summer and water added each week as seemed necessary. 138,930 oriental fruit moths were removed from this orchard in the bait traps. 40 different types of baits were used, some excellent and some poor. An examination of 26 trees on June 4th and June 28th showed 4,930 infested terminals in the unbaited block and 1290 infested terminals in the baited block. Fruit counts of the total crop from two trees in each block showed; 20.8 per cent injury in the unbaited block and 10.8 per cent injury in the baited block. The counts were made without cutting the fruit. Had this been done, the differences would have been much greater."

The use of bait pails to determine the seasonal history of the oriental fruit moth and the codling moth has been practised considerably. The figures presented by L. A. Stearnes show the total catches for two seasons in apple orchards.

"Bait Pan Records in Apple Orchard at Woodside, Delaware, in 1933 and 1934.

(36 pans—1 to 20 syrup bait)

1933—Apple orchard located approximately ½ mile *east* of peach orchard.
Pans operated from April 4 to October 1.
Codling Moth—total, 2572; first on May 10; 1st on September 29.
Oriental Fruit Moth—Total, 2056; first on April 19; last on Sept. 30.
1934—Apple orchard located approximately ½ mile *west* of (same) peach orchard.
Pans operated from May 7 to September 26.
Codling Moth—Total, 1206; first on May 13; last on Sept. 5.
Oriental Fruit Moth—Total, 1055; first on May 8; last on Sept. 25."

The relation of the oriental fruit moth to apple production has received considerable attention by Mr. McConnell and his work may be found in Maryland Experiment Station Bulletin No. 364.

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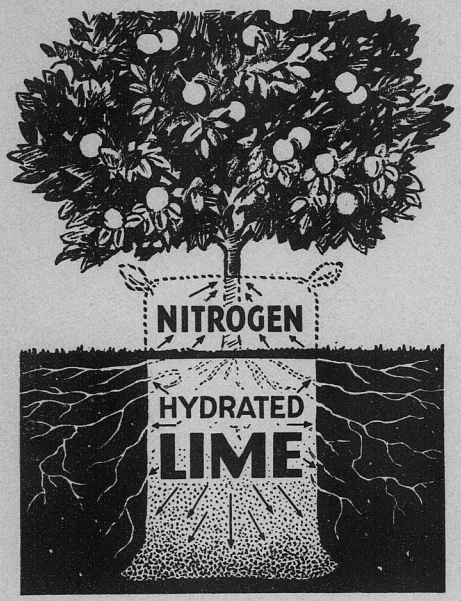
THE CONTEST

In connection with the exhibits, there was a large jar filled with Japanese Beetles. Those present were asked to fill out a ballot guessing how many beetles were in the jar. The guesses ranged from 13,000 to 140,000,000. The actual number of beetles in the jar was 141,916. Mr. E. C. McFadden, Hagerstown, was first with a guess of 140,000. Mr. E. R. Kerlin, Sleepy Creek, W. Va., was second with a guess of 139,000. The prize was a box of apples donated by the Horticultural Department.

HAVE YOU READ THE ADVERTISEMENTS?

Customer: "See here, George, I ordered strawberry short cake, and here you bring me a dish of strawberries. Where's the cake?"

George: "Deed, boss, I'se sure sorry about that, but that's just what we'se short of."



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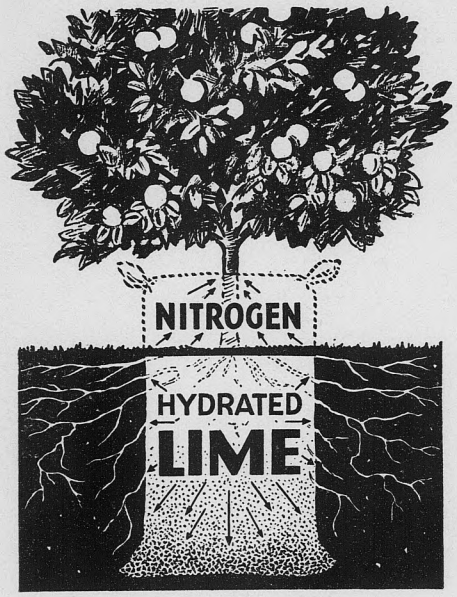
George: "Deed, boss, I'se sure sorry about that, but that's just what we'se short of."



'AERO' CYANAMID

22% NITROGEN
70% HYDRATED LIME

The Fruit Fertilizer

It FEEDS the Tree and LIMES the Soil

'AERO' CYANAMID

A non-leaching form of nitrogen
May be applied in fall, winter (in Southern States), or early spring, as one prefers

Feeds the tree throughout growing season
Produces dark green leaves and holds them on until fall (On sandy and shaly soils the supplemental use of potash is recommended)

Keeps the soil sweet and healthy
Destroys acids resulting from use of sprays and cover crops

Produces good terminal growth and fruit buds
Gives bigger yields of better-quality fruit

●

Write for Leaflet X-307, "Fertilizing Fruit with Granular 'Aero' Cyanamid"

AMERICAN CYANAMID COMPANY
Manufacturers of 'Aero' Cyanamid and 'Ammo-Phos'
30 ROCKEFELLER PLAZA 779 VIRGINIA AVE., N. E.
NEW YORK - - N. Y. ATLANTA - - - GA.

CYANAMID PRODUCTS

'Aero' Cyanamid is Nitrogen plus Lime

-85296

IF IN THE MAD RUSH FOR LOW PRICES

QUALITY HAS BEEN FORGOTTEN

YOUR ORCHARD SUFFERS

For more than 30 years Scalecide has stood for every thing that is best in oil sprays.

Scalecide **costs more**

but is **worth more**

because it **does more**

We guarantee Scalecide to make a better orchard than lime sulfur, or your money back; you and your neighbors to be the judges.

You don't care for insurance? Scalecide will kill every San Jose scale you hit with it; aphis and red mite too.

You have no scale? Maybe you have a codling moth problem. We know of no orchard large or small that uses Scalecide regularly, that has a serious codling moth problem. Why? Because Scalecide kills many of the over-wintering codling moth. A customer writes, "When we had charge of nearly 1000 acres of orchard, and were using Scalecide regularly, we seldom had more than ½ of 1% of codling moth at packing time."

Scalecide kills aphis! With nearly 20,000 apple trees of our own we have not used over one gallon of nicotine for aphis in 20 years. Many nicotine bills alone will pay for the entire cost of Scalecide.

Scalecide is safe! Following the extreme cold winter of 1933-34, trees sprayed with Scalecide did not show winter injury like similar trees sprayed with other sprays in the same orchard.

Let Scalecide by your dormant spray this year. Write for lowest prices and liberal quantity discounts.

B. G. PRATT COMPANY

50 Church Street Dept. "F" New York